2. (Amended) An optical scanning device for scanning optical record carriers with radiation of a selected wavelength, the device including an objective lens, having an axial direction and a radial direction, the objective lens having a phase structure which is non-periodic with respect to the radial direction, the non-periodic phase structure being arranged to compensate for comatic aberrations generated in the objective lens when an optical record carrier is read in a direction which is non-axial with respect to said objective lens, wherein said non-periodic phase structure compensates at least 50% of the root mean square (rms) comatic wavefront error at a certain field angle with respect to the axial direction and caused by the objective.

3. (Amended) The optical scanning device of claim 2, wherein said non-periodic phase structure compensates at least 70% of the root mean square (rms) comatic wavefront error at said certain field angle.

4. (Amended) An optical scanning device for scanning optical record carriers with radiation of a selected wavelength, the device including an objective lens, having an axial direction and a radial direction, the objective lens having a phase structure which is non-periodic with respect to the radial direction, the non-periodic phase structure being arranged to compensate for comatic aberrations generated in the objective lens when an optical record carrier is read in a direction which is non-axial with respect to said objective lens, wherein the rms wavefront error caused by the comatic aberration generated by the objective lens at a maximum required field angle with respect to the axial direction, as compensated by the non-periodic phase structure, is less than 40ml.

5. (Amended) The optical scanning device of claim 4, wherein the rms wavefront error is less

than 20mλ.

6. (Amended) An optical scanning device for scanning optical record carriers with radiation of a selected wavelength, the device including an objective lens, having an axial direction and a radial direction, the objective lens having a phase structure which is non-periodic with respect to the radial direction, the non-periodic phase structure being arranged to compensate for comatic aberrations generated in the objective lens when an optical record carrier is read in a direction which is non-axial with respect to said objective lens, wherein said non-periodic phase structure includes a plurality of annular zones, each of said zones comprising a step of a substantially constant height with respect to a rotationally symmetrical aspheric shape generally followed by said objective lens, said step having a surface located at the substantially constant height such that all points on said step surface are located at about a constant distance from said aspheric shape.

7. (Amended) The optical scanning device of claim 6, wherein said steps generate a relative phase difference of approximately a multiple of 2π for radiation of said selected wavelength when an optical record carrier is read in said axial direction.

8. (Amended) The optical scanning device of claim 6, wherein the radial widths of said zones are selected in dependence on the comatic aberration to be compensated for.

9. (Amended) The optical scanning device of claim 8, wherein said zones comprise a zone (a) with a nonzero height, measured in relation to said aspheric shape, located in the region in which the normalized pupil coordinate ρ ranges from 0.45 to 0.84.

10. (Amended) The optical scanning device of claim 9, wherein said zone (a) ends prior to a normalized pupil coordinate ρ of 0.85.

11. (Amended) The optical scanning device of claim 8, wherein said zones comprise a zone (b) with a nonzero height, measured in relation to said aspheric shape, located in the region in which the normalized pupil coordinate r ranges from 0.9 to 1.00.

12. (Amended) The optical scanning device of claim 11, wherein said zones comprise a plurality of zones with a nonzero height, measured in relation to said aspheric shape, located in the region in which the normalized pupil coordinate ρ ranges from 0.9 to 1.00.

13. (Amended) The optical scanning device of claim 6, wherein the heights of said zones are selected substantially optimally in relation to the comatic aberration to be compensated for.

14. (Amended) The optical scanning device of claim 7, wherein the number of said zones is greater than four.

15. (Amended) The optical scanning device of claim 8, wherein the number of said zones is less than ten.

16. (Amended) The optical scanning device of claim 9, wherein said non-periodic phase structure is formed on the surface of said objective lens.

17. (Amended) An optical system including an optical element having optical power and an axial direction and a radial direction, the optical element having a phase structure which is non-periodic with respect to the radial direction, the non-periodic phase structure being arranged to compensate for comatic aberrations generated by the optical element when an optical beam traverses the optical system in a direction which is non-axial with respect to said element, the non-periodic phase structure having a first step, the first step having a surface located opposite to a surface shape followed by the optical element such that all points on the surface of the first step are located at about a constant distance from said surface shape.

18. (New) The optical system of claim 18, wherein the surface of the first step is oriented substantially parallel to said surface portion.

19. (New) The optical scanning device of claim 18, wherein the non-periodic phase structure comprises a plurality of steps that includes the first step, and wherein said steps generate a relative phase difference of approximately a multiple of 2π when said optical beam is directed in said axial direction.

20. (New) The optical scanning device of claim 18, wherein said non-periodic phase structure compensates at least 50% of the root mean square (rms) comatic wavefront error at a certain field angle with respect to the axial direction and caused by the optical element.

21. (New) The optical scanning device of claim 18, wherein the rms wavefront error caused by the comatic aberration generated by the optical element at a maximum required field angle with respect to the axial direction, as compensated by the non-periodic phase structure, is less than